PATENT APPLICATION

PATENT AND TRADEMARK OFFICE

BEFORE THE HONORABLE BOARD OF PATENT APPEALS AND INTERFERENCES

In re the Application of

Yasuo MATSUMURA et al.

On Appeal from Group: 1756

Application No.: 10/658,811

Examiner: C. RODEE

Filed: September 10, 2003

Docket No.: 117092

For: TONER FOR DEVELOPING ELECTROSTATIC IMAGES CONTAINING SPECIFIED BINDER RESIN, PROCESS FOR PREPARING THE SAME, DEVELOPER FOR DEVELOPING ELECTROSTATIC IMAGES, AND IMAGE FORMING METHOD

RESPONSE TO NOTICE OF NON-COMPLIANT APPEAL BRIEF AND APPEAL BRIEF TRANSMITTAL

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In response to the June 20, 2006, Notice of Non-Complieant Appeal Brief, we attach hereto our replacement Brief on Appeal in the above-identified application.

The Appeal Brief fee under 37 C.F.R. 41.20(b)(2) was paid on May 31, 2006, by our Check No. 180314 in the amount of Five Hundred Dollars ($500.00). In the event of any underpayment or overpayment, please debit or credit our Deposit Account No. 15-0461 as needed in order to effect proper filing of this Brief.

For the convenience of the Finance Division, two additional copies of this transmittal letter are attached.

Respectfully submitted,

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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BRIEF ON APPEAL

Appeal from Group 1756

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I. REAL PARTY IN INTEREST

The real party in interest for this appeal and the present application is Fuji Xerox Co., Ltd., by way of an Assignment recorded in the U.S. Patent and Trademark Office at Reel 014479, Frame 0581.

II. STATEMENT OF RELATED APPEALS AND INTERFERENCES

There are no prior or pending appeals, interferences or judicial proceedings, known to Appellant, Appellant's representative, or the Assignee, that may be related to, or which will directly affect or be directly affected by or have a bearing upon the Board's decision in the pending appeal.

III. STATUS OF CLAIMS

Claims 1-5 and 8-17 are on appeal.

Claims 1-20 are pending.

Claims 6 and 7 are objected to only for being dependent from a rejected base claim, but are otherwise allowable.

Claims 1-5 and 8-17 are rejected.

Claims 18-20 are withdrawn from consideration.

IV. STATUS OF AMENDMENTS

No Amendment After Final Rejection has been filed. A Request for Reconsideration After Final Rejection was filed on March 3, 2006; however, no amendments were made after the December 1, 2006, Final Rejection was mailed.

V. SUMMARY OF CLAIMED SUBJECT MATTER

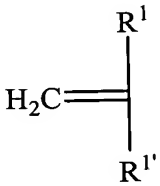
The invention of claim 1 is generally directed to a toner for developing electrostatic images. *See* Specification, page 1, lines 12-17. Toner compositions and their uses in developing electrostatic images are well known. *See* Specification, page 1, line 23 – page 2, line 6. For example, it is known to prepare two-component developer compositions that include a toner and a carrier as well as to prepare one-component developer compositions that include a toner alone. *Id.* However, known toners can have problems producing high-quality, durable images, particularly color images, and also may have problems relating to odor and volatile materials during fixation. In addition, known toners may have problems with respect to light resistance, developing and transferring properties and image clarity. Thus, there is an on-going search for improved toner materials.

Many known toners include a binder resin made from vinyl monomers, usually styrene monomers. *See* Specification, page 12, lines 16-18. Resins produced from styrene tend to have increased brittleness, which makes grinding toners prepared from such monomers efficient. *See* Specification, page 12, lines 20-23. In addition, styrene is a very inexpensive monomer, which allows binders and toners to be prepared inexpensively. *See* Specification, page 12, lines 18-23. However, toners and binder resins containing styrene monomers are prone to producing images lacking in strength, due to the brittleness imparted by styrene, and environmental resistance. *See* Specification, page 12, line 24 – page 13, line 2.

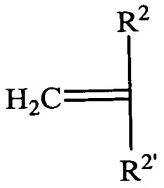
The invention of independent claim 1, and its dependent claims, relates to a toner that includes, as its main component, a binder resin having a specific copolymer. *See* Specification, page 14, line 21 – page 15, line 20. In particular, the claims include a copolymer combining three different monomers, and this combination results in a toner that does not suffer from the deficiencies of styrene-containing toners. *See* Specification, page 14, lines 13-20.

Specifically, independent claim 1 sets forth a "toner for developing electrostatic images, comprising as a main component thereof a binder resin having a copolymer consisting of a combination of a high Tg monomer having a structure represented by the following structural formula (1) and a glass transition temperature of 50°C or higher, a low Tg monomer having a structure represented by the following structural formula (2) and a glass transition temperature of lower than 50°C, and a hydrophilic monomer having a structure represented by the following structural formula (3):

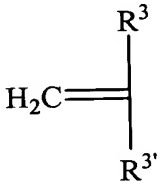
Structural formula (1)



Structural formula (2)



Structural formula (3)



wherein R^1, R^2 and R^3 independently represent a hydrogen atom, an alkyl group, an alkylester group, an alkylether group, a perfluoroalkyl group, a methoxy group, an ethoxy group, a halogen atom, a carbazole group, a pyrrolidone group, a formyl group, a cyclohexyl group, an alkyl group having a functional group, or an alkylester group having a functional group, $R^{1'}$ and $R^{2'}$ independently represent an alkyl group, an alkylester group, an alkylether group, a perfluoroalkyl group, a methoxy group, an ethoxy group, a halogen atom, a carbazole group, a pyrrolidone group, a formyl group, a cyclohexyl group, an alkyl group having a functional group, or an alkylester group having a functional group, and $R^{3'}$ represents a hydrophilic group." *See* Specification, page 14, line 21 – page 15, line 20; page 16, line 19 – page 17, line 18; claim 1.

Claims 2, 4, 5, 8-16 and 18 depend from claim 1. Claims 3 and 17 depend from claims 2 and 16, respectively. Each of these dependent claims are directed to further features

of toners according to the independent claim. Claim 8 is directed to toner that further comprises a compound containing a carboxyl group. Claim 9 is directed to a toner having a shape factor SF1 of 100 to 140, as represented by a specific equation (A). Claim 10 is directed to a toner in which to toner has a surface property index value that is 2.0 or smaller, as represented by a specific equation (B). Claim 11 is directed to toner in which "an average particle diameter of toner particles is 3 to 9 μm." Claim 12 is directed to toner in which "a volume average particle size distribution index GSDv of toner particles is 1.30 or smaller." Claim 14 is directed to a toner that further comprises a releasing agent. Claim 15 is directed to a toner that further comprises colorant particles having a median diameter of 100 to 330 nm. Claim 17 is directed to a two-component developer that comprises the toner and a carrier, in which the average diameter of the toner particles is 100 to 330 nm.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The following grounds of rejection are presented for review:

1) Claims 1-5, 13 and 16 are rejected as anticipated under 35 U.S.C. §102(b) by U.S. Patent No. 4,504,563 to Tanaka et al.;

2) Claims 11, 12, 14 and 17 are rejected as having been obvious under 35 U.S.C. §103(a) over Tanaka in view of Handbook of Imaging Materials, 155-164, 173-187, 209, 210, 217-220 (Arthur S. Diamond & David Weiss eds., Marcel-Dekker, Inc. 2001) ("Diamond");

3) Claim 8 is rejected as having been obvious under 35 U.S.C. §103(a) over Tanaka in view of Diamond and further in view of U.S. Patent Application Publication No. 2003-0077534 to Shiraishi et al.;

4) Claim 9 is rejected as having been obvious under 35 U.S.C. §103(a) over Tanaka in view of U.S. Patent No. 2,297,691 to Carlson; and

5) Claims 9, 10 and 15 are rejected as having been obvious under 35 U.S.C. §103(a) over Tanaka in view of Carlson and further in view of U.S. Patent No. 6,214,510 to Kojima.

VII. ARGUMENT

The Examiner rejects claims 1-5, 13 and 16 under 35 U.S.C. §102(b) over Tanaka.

The Examiner separately rejects claims 11, 12, 14 and 17, which depend directly or indirectly from claim 1, under 35 U.S.C. §103(a) over Tanaka in view of Diamond; rejects claim 8 under 35 U.S.C. §103(a) over Tanaka in view of Diamond and Shiraishi; rejects claim 9 under 35 U.S.C. §103(a) over Tanaka in view of Carlson; and rejects claims 9, 10 and 15 under 35 U.S.C. §103(a) over Tanaka in view of Carlson and Kojima.

In these rejections, the Examiner has consistently improperly applied the law relating to anticipation and to obviousness, and has failed to establish a *prima facie* case of unpatentability. Proper application of the law and consideration of the cited references demonstrates that no *prima facie* case of either anticipation or obviousness has been established.

A. None of the Pending Claims Are Anticipated by Tanaka

1. Factual Inquiries to Determine Anticipation

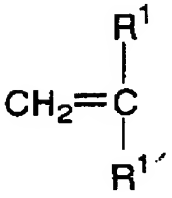
In order to anticipate a claim, the reference must disclose, in specific embodiments, all of the limitations of the claim. That is, a prior art reference anticipates the claimed invention only where all of the claimed elements of the claimed invention are disclosed, either expressly or inherently, in the reference. Scripps Clinic & Research Foundation v. Genentech, Inc., 927 F.2d 1565, 1576, 18 USPQ2d 1001, 1010 (Fed. Cir. 1991); In re Marshall, 577 F.2d 301, 198 USPQ 344 (CCPA 1978).

2. Claims 1-5, 13 and 16 Are Not Anticipated By Tanaka

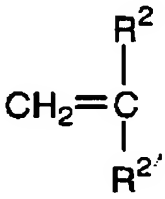
Independent claim 1 sets forth a "toner for developing electrostatic images, comprising as a main component thereof a binder resin having a copolymer consisting of a combination of a high Tg monomer having a structure represented by the following structural formula (1) and a glass transition temperature of 50°C or higher, a low Tg monomer having a

structure represented by the following structural formula (2) and a glass transition temperature of lower than 50°C, and a hydrophilic monomer having a structure represented by the following structural formula (3):

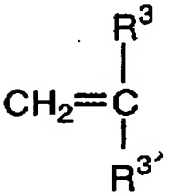
Structural formula (1)



Structural formula (2)



Structural formula (3)



wherein R^1, R^2 and R^3 independently represent a hydrogen atom, an alkyl group, an alkylester group, an alkylether group, a perfluoroalkyl group, a methoxy group, an ethoxy group, a halogen atom, a carbazole group, a pyrrolidone group, a formyl group, a cyclohexyl group, an alkyl group having a functional group, or an alkylester group having a functional group, $R^{1'}$ and $R^{2'}$ independently represent an alkyl group, an alkylester group, an alkylether group, a perfluoroalkyl group, a methoxy group, an ethoxy group, a halogen atom, a carbazole group, a pyrrolidone group, a formyl group, a cyclohexyl group, an alkyl group having a functional group, or an alkylester group having a functional group, and $R^{3'}$ represents a hydrophilic group." Claims 2-5, 13 and 16 depend, directly or indirectly, from claim 1 and include all of the limitations thereof.

Applicants also respectfully submit that Tanaka does not teach, in discrete embodiments, a toner that includes a binder resin as a main component in which the binder resin includes a high Tg monomer of claimed structural formula (1), a low Tg monomer of claimed structural formula (2) and a hydrophilic monomer of claimed structural formula (3).

Tanaka teaches a toner for electrostatic image development in which the toner includes a vinyl copolymer having an acid value in a range of from 5 to 100. *See* Tanaka,

Abstract; col. 2, lines 40-45. The Tanaka reference includes a broad listing of vinyl monomers that may be used alone or in combinations of two or more. *See* Tanaka, col. 2, lines 66-68. This listing includes styrenic monomers, monocarboxylic acid esters, vinyl halides, vinyl esters, acrylic and methacrylic derivatives, vinyl ethers, vinyl naphthalenes, vinyl ketones, and N-vinyl compounds. *See* Tanaka, col. 2, lines 46-66. In addition, Tanaka teaches that copolymers may be formed by copolymerizing one or more of these monomers with a copolymerizable acid, such as acrylic acid, methacrylic acid and the like. *See* Tanaka, col. 2, lines 43-46; col. 3, lines 1-6.

The Examiner takes the position that Tanaka teaches a toner including a binder resin that is a copolymer of a high Tg monomer, a low Tg monomer and a hydrophilic monomer. *See* Tanaka, col. 2, line 43 – col. 3, line 6. Specifically, the Examiner cites to Tanaka's claim 7 [11], which claims a vinyl copolymer that is a methyl methacrylate/iso-butyl methacrylate/methacrylic acid copolymer. *See* Tanaka, claim 11.

However, Tanaka's broad disclosures of toners that may include binder resins having copolymers that include monomers such as those set forth in claim 1 does not include any teaching of the claimed toners or the benefits that can be achieved by the claimed toners.

Tanaka discloses copolymers that may be formed from a broad listing of monomers including styrenic monomers, monocarboxylic acid esters, vinyl halides, vinyl esters, acrylic and methacrylic derivatives, vinyl ethers, vinyl naphthalenes, vinyl ketones, and N-vinyl compounds; and optionally copolymerizable acidic monomers. *See* Tanaka, col. 2, line 46 – col. 3, line 6. However, Tanaka does not provide any teachings that would lead one of ordinary skill to select, specifically, a high Tg monomer of claimed structural formula (1), a low Tg monomer of claimed structural formula (2) and a hydrophilic monomer of claimed structural formula (3) to form the binder resin of its toners. *See generally* Tanaka.

Although Tanaka's claim 11 indicates that its vinyl copolymer is a methyl methacrylate/iso-butyl methacrylate/methacrylic acid copolymer, Tanaka does not provide any examples relating to toner prepared using such a copolymer, nor does Tanaka indicate that these monomers are chosen so that high Tg monomer, a low Tg monomer and a hydrophilic monomer are included in the copolymer. *See generally* Tanaka.

As a practical matter, Tanaka only discloses toners that include styrenic monomers; that is, all of the toners of the Tanaka examples include styrene monomers. *See* Tanaka, col. 5, line 60 - col. 9, line 10. Styrene is an inexpensive component often used in the binder resins of toners (*see* Specification, page 12, lines 16-23), which would motivate one of ordinary skill to include styrene, or a derivative thereof, as a monomer where one or more ethylenically unsaturated monomers are used. That is, one of ordinary skill would not be motivated to prepare a copolymer from the monomers disclosed in Tanaka without including a styrenic monomer as an ethylenically unsaturated monomer, particularly in light of the Tanaka examples, all of which include a styrenic monomer. *See* Tanaka, col. 5, line 60 - col. 9, line 5. However, styrene-containing toners -- like those illustrated by Tanaka -- often have problems, due to the brittleness of the styrenic component. *See* Specification, page 12, line 24 - page 13, line 2.

In contrast, the claimed toners exclude styrene and its derivatives from their binder resins. By eliminating styrene, the claimed toners avoid emission of odors and volatile components associated with styrene-containing toners, have excellent low temperature fixing, and provide images that are durable, glossy and have excellent image quality. *See* Specification, page 18, line 5 - page 19, line 1.

Tanaka does not contemplate any of these issues, and one of ordinary skill in the art, based on the teachings of Tanaka would not have understood that by choosing the specific combination of monomer types set forth in claim 1, and by excluding styrenic components, a

toner could be prepared that would avoid emission of odors and volatile components associated with styrene-containing toners, have excellent low temperature fixing, and provide images that are durable, glossy and have excellent image quality. Tanaka at most merely discloses the possible formation of the claimed polymer, but only if three monomers having the specifically claimed structural formulas are specifically selected from Tanaka's generic list of possible monomers, and thus does not anticipate the claimed invention. *See, e.g.,* Ultradent Products, Inc. v. Life-Like Cosmetics, Inc., 127 F.3d 1065, 1071-72, 44 USPQ2d 1336, 1341-42 (Fed. Cir. 1997), where the Federal Circuit held that that the mere disclosure of numerous possible combinations does not necessarily anticipate the claimed specific combination. The Court stated "the burden [of showing anticipation] was to show that the [reference] would describe to one of skill in the art ... combinations meeting the limitations of the claims, from among the many possible candidates." *See also* In re Petering, 301 F.2d 676, 681, 133 USPQ 275, 279 (C.C.P.A. 1962), where the court held that "even though appellants' claimed compounds are encompassed by the broad generic disclosure, we do not think this disclosure by itself describes appellants' invention ... within the meaning of 35 U.S.C. 102(b)." It is thus not sufficient that Tanaka merely teaches the elements of the claimed polymer; rather, the reference must disclose combining those separate components according to the claimed invention. Tanaka includes no such teaching.

Applicants respectfully submit that, for at least the reasons set forth above, Tanaka cannot support the rejection of independent claim 1 and dependent claims 2, 4-7, 14 and 16.

B. Claims 8-12, 14, 15 and 17 Would Not Have Been Obvious Over Tanaka in View of the Secondary References

The Examiner rejects claims 8-12, 14, 15 and 17, all of which depend either directly or indirectly from claim 1, under 35 U.S.C. §103(a) over Tanaka in view of various secondary references. Specifically, claims 11, 12, 14 and 17 are rejected over Tanaka in view of

Diamond; claim 8 is rejected over Tanaka in view of Diamond and Shiraishi; claim 9 is rejected over Tanaka in view of Carlson; and claims 9, 10 and 15 are rejected over Tanaka in view of Carlson and Kojima.

1. Factual Inquiries to Determine Obviousness/Non-Obviousness

Several basic factual inquiries must be made in order to determine obviousness or non-obviousness of the claims of a patent application under 35 U.S.C. §103(a). These factual inquiries include considering the scope and content of the prior art, the differences between the prior art and the claims at issue, the level of ordinary skill in the art, and any secondary considerations that may be present. Graham v. John Deere Co., 383 U.S. 1, 17, 148 USPQ 459, 467 (1966).

In addition, the combination of references to support a rejection requires a motivation or suggestion in the art that one should carry out the claimed invention, and would have a reasonable expectation of success in doing so. In re Vaeck, 947 F.2d 488, 493, 20 USPQ2d 1438, 1442 (Fed. Cir. 1991). In the present case, proper consideration of the actual teachings of the cited references and the level of ordinary skill in the art provide no motivation or suggestion that the cited references should or could be combined to provide the claimed toner.

2. Claims 11, 12, 14 and 17 Would Not Have Been Obvious Over Tanaka in View of Diamond

Independent claim 1 is as set forth above. Claims 11, 12, 14 and 17 depend, directly or indirectly, from claim 1 and incorporate all of the limitations thereof. Claim 11 is further directed to toner in which "an average particle diameter of toner particles is 3 to 9 μm." Claim 12 is further directed to toner in which "a volume average particle size distribution index GSDv of toner particles is 1.30 or smaller." Claim 14 is further directed to a toner that further comprises a releasing agent. Claim 17 is further directed to a two-component developer that comprises the toner and a carrier, in which the average diameter of the toner particles is 100 to 330 nm.

The Examiner cites Tanaka as in the rejection of claim 1, which is discussed above, and further cites Diamond for its teachings relating to typical toner particle sizes and particle size distributions, inclusion of release agents in toners, and typical carrier particle sizes.

a. Tanaka Does Not Teach or Suggest the Claimed Invention

As discussed above, Tanaka does not disclose, nor does Tanaka suggest, a toner as set forth in claim 1. Specifically, Tanaka does not provide any teachings or suggestions that would lead one of ordinary skill to select, specifically, a high Tg monomer of claimed structural formula (1), a low Tg monomer of claimed structural formula (2) and a hydrophilic monomer of claimed structural formula (3) to form the binder resin of its toners. *See generally* Tanaka. In addition, Tanaka does not teach or suggest the benefits that can be achieved by the claimed toners. The Examiner admits that Tanaka does not teach the specific features of dependent claims 11, 12, 14 and 17.

b. Diamond Does Not Overcome the Deficiencies of Tanaka

Diamond is a reference text relating to imaging materials. *See generally* Diamond. Among the general teachings of Diamond are teachings relating to the features of each of claims 11, 12, 14 and 17. *Id.* In particular, Diamond includes general teachings of toner particle sizes and distributions, the inclusion of release agents in toners, and two-component developer systems that incorporate carrier materials having specific sizes. *Id.* Diamond further includes teachings relating to the inclusion of charge control agents in toners. *Id.*

However, Diamond does not provide any teachings relating to preparation of binder resins for toners using copolymers of the specifically claimed monomer types. In particular, Diamond does not teach or even suggest that a "toner ... comprising as a main component thereof a binder resin having a copolymer consisting of a combination of a high Tg monomer having a structure represented by the [claimed] structural formula (1) and a glass transition temperature of 50°C or higher, a low Tg monomer having a structure represented by the

[claimed] structural formula (2) and a glass transition temperature of lower than 50°C, and a hydrophilic monomer having a structure represented by the [claimed] structural formula (3)," as set forth in independent claim 1.

c. The Combination of Tanaka and Diamond Fails to Suggest the Claimed Invention

As discussed above, Tanaka does not disclose or suggest a "toner ... comprising as a main component thereof a binder resin having a copolymer consisting of a combination of a high Tg monomer having a structure represented by the [claimed] structural formula (1) and a glass transition temperature of 50°C or higher, a low Tg monomer having a structure represented by the [claimed] structural formula (2) and a glass transition temperature of lower than 50°C, and a hydrophilic monomer having a structure represented by the [claimed] structural formula (3)," as set forth in claim 1.

As discussed immediately above, Diamond also does not disclose or suggest such a toner claimed in claim 1.

Neither reference teaches or suggests that the references could or should be combined to produce the claimed invention. Even if the Tanaka and Diamond references were combined, the combination would not result in the invention of claim 1 or of its dependent claims 11, 12, 14 or 17. Rather, combining Tanaka and Diamond would merely provide toner particle sizes and distributions, the inclusion of release agents in toners, and two-component developer systems that incorporate carrier materials having specific sizes for use with the Tanaka toners.

d. Conclusion

Applicants respectfully submit that, for at least the reasons set forth above, Tanaka and Diamond, individually and in combination, cannot support the rejection of claims 11, 12, 14 and 17.

3. Claim 8 Would Not Have Been Obvious Over Tanaka in View of Diamond and Shiraishi

Independent claim 1 is as set forth above. Claim 8 depends from claim 1 and incorporates all of the limitations thereof. Claim 8 is further directed to toner that further comprises a compound containing a carboxyl group.

a. The Combination of Tanaka and Diamond Does Not Teach or Suggest the Claimed Invention

As discussed above, Tanaka and Diamond, individually or in combination, do not disclose or suggest a "toner ... comprising as a main component thereof a binder resin having a copolymer consisting of a combination of a high Tg monomer having a structure represented by the [claimed] structural formula (1) and a glass transition temperature of 50°C or higher, a low Tg monomer having a structure represented by the [claimed] structural formula (2) and a glass transition temperature of lower than 50°C, and a hydrophilic monomer having a structure represented by the [claimed] structural formula (3)," as set forth in claim 1.

b. Shiraishi Does Not Overcome the Deficiencies of Tanaka and Diamond

Shiraishi relates generally to charge control agents and toners including charge control agents. *See generally* Shiraishi. In particular, Shiraishi teaches that toners may include charge control agents having carboxyl groups. *See* Shiraishi, [0022]-[0023]; [0027]-[0028]. Shiraishi also includes broad teachings relating to the binder resins of its toners, which may be homopolymers or copolymers of monomers including styrenic monomers, monocarboxylic acid esters, vinyl halides, vinyl esters, acrylic and methacrylic derivatives, vinyl ethers, vinyl naphthalenes, vinyl ketones, and N-vinyl compounds. *See* Shiraishi, [0038]. The Shiraishi toners may also be chosen from other resins, including polyester resins, polyurethane resins, polyol resins, polyamide resins, epoxy resins, rosins, modified rosins, terpene resins,

phenolics resins, hydrogenated petroleum resins, ionomer resins, silicone resins, ketone resins, and xylene resins. *Id.*

However, Shiraishi does not provide any teachings relating to preparation of binder resins for toners using copolymers of the specifically claimed monomer types. In particular, Shiraishi does not teach or even suggest that a "toner ... comprising as a main component thereof a binder resin having a copolymer consisting of a combination of a high Tg monomer having a structure represented by the [claimed] structural formula (1) and a glass transition temperature of 50°C or higher, a low Tg monomer having a structure represented by the [claimed] structural formula (2) and a glass transition temperature of lower than 50°C, and a hydrophilic monomer having a structure represented by the [claimed] structural formula (3)," as set forth in independent claim 1. Rather, Shiraishi only discloses toners that include as binder resins styrenic copolymers and/or resins of polyesters or polyols; that is, all of the toners of the Shiraishi examples that include copolymers include styrene-containing copolymers. *See* Shiraishi, [0057]-[0132]. As discussed above with respect to Tanaka, one of ordinary skill would not have been motivated by such a disclosure to prepare a copolymer without including a styrenic monomer as an ethylenically unsaturated monomer. *Id.*

In contrast, the claimed toners exclude styrene and its derivatives from their binder resins, avoiding odors and volatile components emissions associated with styrene-containing toners, have excellent low temperature fixing, and provide images that are durable, glossy and have excellent image quality. *See* Specification, page 18, line 5 - page 19, line 1.

Shiraishi, like Tanaka, does not contemplate any of these issues, and one of ordinary skill in the art, based on the teachings of Shiraishi and/or Tanaka would not have understood that by choosing the specific combination of monomer types set forth in claim 1, and by excluding styrenic components, a toner could be prepared that would avoid emission of odors and volatile components associated with styrene-containing toners, have excellent low

temperature fixing, and provide images that are durable, glossy and have excellent image quality.

c. The Combination of Tanaka, Diamond and Shiraishi Fails to Suggest the Claimed Invention

As discussed above, none of Tanaka, Diamond and Shiraishi disclose or suggest a "toner ... comprising as a main component thereof a binder resin having a copolymer consisting of a combination of a high Tg monomer having a structure represented by the following structural formula (1) and a glass transition temperature of 50°C or higher, a low Tg monomer having a structure represented by the following structural formula (2) and a glass transition temperature of lower than 50°C, and a hydrophilic monomer having a structure represented by the following structural formula (3)," as set forth in claim 1.

None of the cited reference teaches or suggests that the references could or should be combined to produce the claimed invention. Even if the Tanaka, Diamond and Shiraishi references were combined, the combination would not result in the invention of claim 1 or of its dependent claim 8. Rather, combining Tanaka, Diamond and Shiraishi would merely result in the Tanaka toners including styrene-containing binder resins and charge control agents.

d. Conclusion

Applicants respectfully submit that, for at least the reasons set forth above, Tanaka, Diamond and Shiraishi, individually and in combination, cannot support the rejection of claim 8.

4. Claim 9 Would Not Have Been Obvious Over Tanaka in View of Carlson

Independent claim 1 is as set forth above. Claim 9 depends from claim 1 and incorporates all of the limitations thereof. Claim 9 is further directed to a toner in which "a shape factor SF1, of the toner, represented by the [claimed] equation (A) is 100 to 140."

a. Tanaka Does Not Teach or Suggest the Claimed Invention

As discussed above, Tanaka does not disclose or suggest a "toner ... comprising as a main component thereof a binder resin having a copolymer consisting of a combination of a high Tg monomer having a structure represented by the [claimed] structural formula (1) and a glass transition temperature of 50°C or higher, a low Tg monomer having a structure represented by the [claimed] structural formula (2) and a glass transition temperature of lower than 50°C, and a hydrophilic monomer having a structure represented by the [claimed] structural formula (3)," as set forth in claim 1.

b. Carlson Does Not Overcome the Deficiencies of Tanaka

Carlson is directed generally to electrophotography. *See generally* Carlson. Carlson relates to photoconductive materials and, more specifically, teaches that generally spherical particles are preferable for the Carlson electrophotographic processes. *See* Carlson, page 3, left column, line 71 – page 3, right column, line 3.

The Examiner takes the position that these teachings would render obvious the specific shape factor SF1 of 100 to 140, as determined by Equation (A). However, Carlson does not disclose or suggest particles having a specific shape factor, nor does it disclose or suggest the claimed equation for determining shape factor. *See generally* Carlson.

In addition, Carlson does not teach or suggest toners including binder resins including, as a main component, a copolymer as set forth in claim 1. In particular, Carlson does not teach or even suggest that a "toner ... comprising as a main component thereof a binder resin having a copolymer consisting of a combination of a high Tg monomer having a structure represented by the [claimed] structural formula (1) and a glass transition temperature of 50°C or higher, a low Tg monomer having a structure represented by the [claimed] structural formula (2) and a glass transition temperature of lower than 50°C, and a hydrophilic

monomer having a structure represented by the [claimed] structural formula (3)," as set forth in independent claim 1.

c. The Combination of Tanaka and Carlson Fails to Suggest the Claimed Invention

As discussed above, neither Tanaka nor Carlson discloses or suggests a "toner ... comprising as a main component thereof a binder resin having a copolymer consisting of a combination of a high Tg monomer having a structure represented by the following structural formula (1) and a glass transition temperature of 50°C or higher, a low Tg monomer having a structure represented by the following structural formula (2) and a glass transition temperature of lower than 50°C, and a hydrophilic monomer having a structure represented by the following structural formula (3)," as set forth in claim 1.

Neither reference teaches or suggests that the references could or should be combined to produce the claimed invention. Even if the Tanaka and Carlson references were combined, the combination would not result in the invention of claim 1 or of its dependent claim 9. Rather, combining Tanaka and Carlson would merely result in toners prepared according to Tanaka that had generally spherical shapes.

d. Conclusion

Applicants respectfully submit that, for at least the reasons set forth above, Tanaka and Carlson, individually and in combination, cannot support the rejection of claim 9.

5. Claims 9, 10 and 15 Would Not Have Been Obvious Over Tanaka in View of Carlson and Kojima

Independent claim 1 is as set forth above. Claims 9, 10 and 15 depend, directly or indirectly, from claim 1 and incorporate all of the limitations thereof. Claim 9 is further directed to a toner in which "a shape factor SF1, of the toner, ... is 100 to 140." Claim 10 is further directed to a toner in which "a surface property index value, of the toner, ... is 2.0 or

smaller." Claim 15 is further directed to a toner that further comprises colorant particles having a median diameter of 100 to 330 nm.

a. The Combination of Tanaka and Carlson Does Not Teach or Suggest the Claimed Invention

As discussed above, Tanaka and Carlson, individually and in combination, do not disclose or suggest a "toner ... comprising as a main component thereof a binder resin having a copolymer consisting of a combination of a high Tg monomer having a structure represented by the [claimed] structural formula (1) and a glass transition temperature of 50°C or higher, a low Tg monomer having a structure represented by the [claimed] structural formula (2) and a glass transition temperature of lower than 50°C, and a hydrophilic monomer having a structure represented by the [claimed] structural formula (3)," as set forth in claim 1.

b. Kojima Does Not Overcome the Deficiencies of Tanaka and Carlson

Kojima is cited for its disclosures relating to surface property index, shape factor SF1 and colorant particle sizes. However, Kojima does not teach or suggest binder resins including a copolymer as set forth in claim 1.

Kojima relates generally to external addition toners. *See generally* Kojima. In particular, Kojima teaches that its toners have a shape coefficient (shape factor) of 134 or less and a surface property index of 5.1 or less. *See* Kojima, col. 2, lines 15-62. In addition, the Kojima toners may include colorant particles having an average particle diameter of less than 1 μm. *See* Kojima, col. 10, lines 13-14.

However, Kojima does not provide any teachings relating to preparation of binder resins for toners using copolymers of the specifically claimed monomer types. In particular, Kojima does not teach or even suggest that a "toner ... comprising as a main component thereof a binder resin having a copolymer consisting of a combination of a high Tg monomer

having a structure represented by the [claimed] structural formula (1) and a glass transition temperature of 50°C or higher, a low Tg monomer having a structure represented by the [claimed] structural formula (2) and a glass transition temperature of lower than 50°C, and a hydrophilic monomer having a structure represented by the [claimed] structural formula (3)," as set forth in independent claim 1. Rather, Kojima discloses toners that include as binder resins homopolymers and copolymers of monomers including styrene compounds, ester compounds that have a vinyl group, vinyl nitrile compounds, vinyl ether compounds, vinyl ketone compounds, and olefins. *See* Kojima, col. 9, lines 11-30. In addition, the binder resins may include non-vinyl condensation resins and graft copolymers of non-vinyl condensation resins and vinylic resins. *See* Kojima, col. 9, lines 30-34.

In contrast, the claimed toners exclude styrene and its derivatives from their binder resins, avoiding odors and volatile components emissions associated with styrene-containing toners, have excellent low temperature fixing, and provide images that are durable, glossy and have excellent image quality. *See* Specification, page 18, line 5 - page 19, line 1.

Kojima, like Tanaka, does not contemplate any of these issues, and one of ordinary skill in the art, based on the teachings of Kojima and/or Tanaka would not have understood that by choosing the specific combination of monomer types set forth in claim 1, and by excluding styrenic components, a toner could be prepared that would avoid emission of odors and volatile components associated with styrene-containing toners, have excellent low temperature fixing, and provide images that are durable, glossy and have excellent image quality.

c. The Combination of Tanaka, Carlson and Kojima Fails to Suggest the Claimed Invention

As discussed above, none of Tanaka, Carlson and Kojima disclose or suggest a "toner ... comprising as a main component thereof a binder resin having a copolymer

consisting of a combination of a high Tg monomer having a structure represented by the following structural formula (1) and a glass transition temperature of 50°C or higher, a low Tg monomer having a structure represented by the following structural formula (2) and a glass transition temperature of lower than 50°C, and a hydrophilic monomer having a structure represented by the following structural formula (3)," as set forth in claim 1.

None of the cited reference teaches or suggests that the references could or should be combined to produce the claimed invention. Even if the Tanaka, Carlson and Kojima references were combined, the combination would not result in the invention of claim 1 or of its dependent claims 9, 10 and 15. Rather, combining Tanaka, Carlson and Kojima would merely result in the Tanaka toners, including styrene-containing binder resins, that have a shape coefficient (shape factor) of 134 or less, a surface property index of 5.1 or less and optionally including colorant particles having an average particle diameter of less than 1 μm.

d. Conclusion

Applicants respectfully submit that, for at least the reasons set forth above, Tanaka, Carlson and Kojima, individually and in combination, cannot support the rejection of claims 9, 10 and 15.

6. Conclusion

For at least these reasons, independent claim 1 and its dependent claims 8-12, 14, 15 and 17 are patentable over Tanaka, individually and in the various combinations with secondary references Diamond, Shiraishi, Carlson and Kojima.

VIII. CONCLUSION

For all of the reasons discussed above, it is respectfully submitted that the rejections are in error and that claims 1-5 and 8-17 are in condition for allowance. For all of the above reasons, Appellants respectfully request this Honorable Board to reverse the rejections of claims 1-5 and 8-17.

Respectfully submitted,

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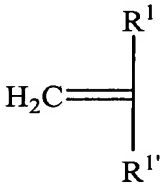
APPENDIX A - CLAIMS APPENDIX

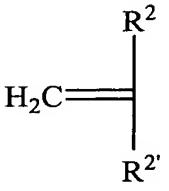
CLAIMS INVOLVED IN THE APPEAL:

1. (Previously Presented) A toner for developing electrostatic images, comprising as a main component thereof a binder resin having a copolymer consisting of a combination of a high Tg monomer having a structure represented by the following structural formula (1) and a glass transition temperature of 50°C or higher, a low Tg monomer having a structure represented by the following structural formula (2) and a glass transition temperature of lower than 50°C, and a hydrophilic monomer having a structure represented by the following structural formula (3):

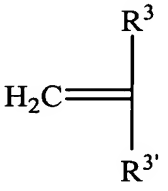
Structural formula (1)



Structural formula (2)



Structural formula (3)



wherein R^1, R^2 and R^3 independently represent a hydrogen atom, an alkyl group, an alkylester group, an alkylether group, a perfluoroalkyl group, a methoxy group, an ethoxy group, a halogen atom, a carbazole group, a pyrrolidone group, a formyl group, a cyclohexyl group, an alkyl group having a functional group, or an alkylester group having a functional group, $R^{1'}$ and $R^{2'}$ independently represent an alkyl group, an alkylester group, an alkylether group, a perfluoroalkyl group, a methoxy group, an ethoxy group, a halogen atom, a carbazole group, a pyrrolidone group, a formyl group, a cyclohexyl group, an alkyl group having a functional group, or an alkylester group having a functional group, and $R^{3'}$ represents a hydrophilic group.

2. (Original) A toner according to claim 1, wherein the toner is prepared by a wet process.

3. (Original) A toner according to claim 2, wherein the wet process comprises an aggregating step of obtaining aggregated particles by aggregating particles containing a binder resin in a dispersion in which the particles are dispersed, and a step of fusing the aggregated particles by heating.

4. (Original) A toner according to claim 1, wherein at least one of the high Tg monomer and the low Tg monomer is a methacrylic acid ester or an acrylic acid ester.

5. (Original) A toner according to claim 1, wherein the hydrophilic group represented by $R^{3'}$ contains any of a carboxyl group, a hydroxyl group, an amino group, a sulfonyl group, and an amido group.

6. (Previously Presented) A toner according to claim 1, wherein the binder resin contains a cyclic reactive group, and is cross-linked at a temperature of 100°C or more.

7. (Original) A toner according to claim 6, wherein the cyclic reactive group is any of an epoxy group, an aziridinyl group and an oxazoline group.

8. (Original) A toner according to claim 1, further comprising a compound containing a carboxyl group.

9. (Original) A toner according to claim 1, wherein a shape factor SF1, of the toner, represented by the following equation (A) is 100 to 140:

Equation (A)

$$SF1 = ML^2/(4A/\pi) \times 100$$

wherein ML represents a maximum length (μm) of the toner, and A represents a projected area (μm^2) of the toner.

10. (Original) A toner according to claim 1, wherein a surface property index value, of the toner, represented by the following equation (B) is 2.0 or smaller:

Equation (B) (surface property index value) = (specific surface area measured value)/(specific surface area calculated value)

wherein specific surface area calculated value is represented by $6\,\Sigma(n \times R^2)/\{\rho \times \Sigma(n \times R^3)\}$ and, in the equation representing the specific surface area calculated value, n represents the number of particles in a channel (number/channel) in a coulter counter, R represents a channel particle diameter (μm) in the coulter counter, ρ represents a toner density ($g/\mu m^3$), a division number of the channel is 16, and the intervals of division are 0.1 at a log scale.

11. (Original) A toner according to claim 1, wherein an average particle diameter of toner particles is 3 to 9 μm.

12. (Original) A toner according to claim 1, wherein a volume average particle size distribution index GSDv of toner particles is 1.30 or smaller.

13. (Original) A toner according to claim 1, wherein an apparent weight average molecular weight of the toner is 15,000 to 55,000.

14. (Original) A toner according to claim 1, further comprising a releasing agent.

15. (Original) A toner according to claim 1, comprising colorant particles whose median diameter is 100 to 330 nm.

16. (Original) A two-component developer, comprising the toner according to claim 1 and a carrier.

17. (Original) A two-component developer according to claim 16, wherein an average diameter of carrier particles is 20 to 150 μm.

18. (Withdrawn) A process for preparing the toner of claim 1, comprising an aggregating step of obtaining aggregated particles by aggregating particles containing a binder resin in a dispersion in which the particles are dispersed, and a fusing step of fusing the aggregated particles by heating.

19. (Withdrawn) An image forming method, comprising the steps of: forming an electrostatic latent image on an electrostatic image holding member, developing the electrostatic latent image with a developer to form a toner image, transferring the toner image onto a transfer receiving material, and thermally fixing the toner image, wherein the developer contains the toner of claim 1.

20. (Withdrawn) An image forming method according to claim 19, wherein the developer further contains a carrier.

APPENDIX B - EVIDENCE APPENDIX

NONE

APPENDIX C - RELATED PROCEEDINGS APPENDIX

NONE